COENOLOGICAL CHARACTERISTICS OF SOIL APTERYGOTA IN NATURAL GRASSLAND AT KAMENIČKY+

Josef RUSEK

1. Introduction

In 1973, an investigation was started of the mesofauna in grassland soils at Kameničky and in the adjoining area of the Bohemian-Moravian Uplands. Soil samples were taken regularly from 22 localities in which plant communities had been identified (cf. BALÁTOVÁ-TULÁČKOVÁ et al. 1977). The samples were examined for the presence of soil Apterygota and other members of the soil mesofauna in order to assess a quantitative representation of various groups of the mesofauna, their biomass and dynamics throughout the year, and their relationships to phytocoenoses and soil types. Both quantitative and qualitative changes in the soil fauna were estimated on managed plots fertilized with different quantities of mineral fertilizers (cf. HALVA et LESÁK 1979).

The present paper contains characteristics of Apterygota inhabiting the soil of the natural grassland at Kameničky which was neither mowed nor fertilized (Polygalo-Nardetum strictae PREISING 1950 corr. OBERDORFER 1957). Attention was given also to other groups of the mesofauna (Oribatei, other Acarina, Pauropoda, Symphyla, insect larvae, etc.), but only as regards their quantity; while only Apterygota were determined in our material.

2. Methods

In June 1973, 30 soil samples of 10 cm^2 were taken along two transects of the experimental plot. The samples were placed separately in paper bags, transported to the laboratory and dried in Tullgren funnels. The identification of the Apterygota species in the material was

---

+Reprinted from RYCHNOVSKÁ, M. (ed.): Progress Report on MAB Project No 91: Function of Grasslands in Spring Region - Kameničky Project. Brno 1979.

followed by calculation of a biomass by means of multiplying the body length with the pertinent index. This method was also employed for calculating the biomass of oribatids and other mites (Parasitiformes and Trombidiformes).

3. Results

21 Apterygota species in the samples were identified (TABLE 27). Of the order Protura, these included the species Eosentomon transitorium, E. bohemicum, and E. kamenickiense, of which the last was described as a new species. Diplura and Thysanura were not present in the samples. Collembola were represented by 19 species. The relatively low representation of Collembola indicated that conditions of the ecosystem were rather extreme. The only euconstant species was Isotomiella minor, the constant species were represented by Isotoma notabilis, Lepidocyrtus lignorum, Folsomia quadrioculata, Megalothorax minimus, Onychiurus armatus, Stenaphorura quadrispina, and Mesaphorura krausbaueri. The areas of distribution of these species are Europe, Palearctic or Holarctic regions. Typical of grassland soils are Stenaphorura quadrispina and Mesaphorura krausbaueri, the remaining euconstant and constant species occupy also the moist forest soils. Since an Apterygota community occupies a minimum space of 30 cm^2, it might be covered by 3 samples per 10 cm^2. Our collection of 10 samples surpasses by far the statistical significance of basic characteristics of the community.

The abundance of Apterygota on the experimental plot averaged 29 900 specimens . m^{-2}. It was 2.7 times lower than that of Oribatei averaging 80 200 specimens . m^{-2}. The abundance of the remaining Acarina was only slightly higher than that of Apterygota, i.e. 34 500 specimens. m^{-2}. We found no relationships as regards the abundance of these three groups of the soil mesofauna. The variability of abundance in 30 samples was similar to that of Enchytraeidae from forest and grassland soils, as reported by NILSEN (1955) and O'CONOR (1957). The set of samples examined contained only a small number of samples with either a low or very high abundance; in most samples the abundance was close to average values. The biomass of Apterygota (related to fresh weight)

TABLE 27 Soil Apterygota in natural grassland at Kameničky

	A	D	C
Isotomiella minor	5 967	19.9	96.6
Isotoma notabilis	3 867	12.9	73.3
Lepidocyrtus lignorum	3 233	10.8	70.0
Folsomia quadrioculata	1 567	5.2	66.6
Megalothorax minimus	1 733	5.7	63.3
Onychiurus armatus	1 200	4.0	63.3
Stenaphorura quadrispina	4 100	13.7	56.6
Mesaphorura krausbaueri	2 933	9.8	56.6
Tomocerus flavescens	933	3.1	46.6
Friesea reducta	666	2.2	40.0
Eosentomon kamenickiense	867	2.9	36.6
Sminthurides schoetti	900	3.0	33.3
Lepidocyrtus cyaneus	533	1.8	33.3
Heterosminthurus bilineatus	-	1.3	26.6
Sminthurides malmgreni	-	0.7	13.0
Isotoma viridis	-	1.5	10.0
Folsomia inoculata	-	0.5	10.0
Sminthurinus aureus	-	0.2	6.0
Sphaeridia sp.	-	0.1	3.3
Eosentomon bohemicum	-	0.1	3.3
Eosentomon transitorium	-	0.1	3.3
	29 900		

A = number of individuals per m^2; D = dominance; C = constancy

was 2.6 g . m^{-2}, that of Oribatei 7.7 g . m^{-2}, of the remaining Acarina 2.1 g . m^{-2}.

REFERENCES

BALÁTOVÁ-TULÁČKOVÁ, E., ZELENÁ, V. et TESAŘOVÁ, M. (1977): Synökologische Charakteristik einiger wichtiger Wiesentypen des Naturschutzgebietes Žďárské vrchy. - Rozpravy ČSAV, Praha, MPV, 87 (5): 1 - 115.

HALVA, E. et LESÁK, J. (1979): Fertilization and exploitation effects in natural and man-made grasslands at Kameničky. - In: RYCHNOVSKÁ, M. (ed.): Progress Report on MAB Project No 91: Function of Grasslands in Spring Region - Kameničky Project. Brno.

NILSEN, C.O. (1955): A technique for extracting Enchytraeidae from soil samples. - In: KEVAN, D. K. McE (ed.): Soil Zoology. London, pp. 365 - 372.

O'CONOR, F.B. (1957): An ecological study of the Enchytraeid worm population of a coniferous forest soil. - Oikos, Copenhagen, 8: 161 - 169.

ADDRESS OF THE AUTHOR:

Josef RUSEK, Institute of Entomology, Czechoslovak Academy of Sciences, Viničná 7, 128 00 Praha 2, Czechoslovakia.